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Similarly,

$$\begin{aligned}
 x_{n-1} &= \frac{xQ_{n-2}-P_{n-2}}{P_{n-1}-xQ_{n-1}}, \quad x_{n-2} = \frac{xQ_{n-3}-P_{n-3}}{P_{n-2}-xQ_{n-2}}, \dots, \quad x_{n-k} = \frac{xQ_{n-(k+1)}-P_{n-(k+1)}}{P_{n-k}-xQ_{n-k}}. \\
 \therefore x_n x_{n-1} \dots x_{n-k} &= \left[\frac{xQ_{n-1}-P_{n-1}}{P_n-xQ_n} \right] \cdot \left[\frac{xQ_{n-2}-P_{n-2}}{P_{n-1}-xQ_{n-1}} \right] \cdot \left[\frac{xQ_{n-3}-P_{n-3}}{P_{n-2}-xQ_{n-2}} \right] \\
 &\quad \left[\frac{xQ_{n-4}-P_{n-4}}{P_{n-3}-xQ_{n-3}} \right] \dots \dots \left[\frac{xQ_{n-(k+1)}-P_{n-(k+1)}}{P_{n-k}-xQ_{n-k}} \right] \\
 &= (-1)^{k+1} \left[\frac{P_{n-(k+1)}-xQ_{n-(k+1)}}{P_n-xQ_n} \right] = (-1)^{k+1}(A), \text{ suppose.}
 \end{aligned}$$

$$\therefore (-1)^{k+1} x_n \times x_{n-1} \dots x_{n-k} = (-1)^{2k+2}(A) = A = \text{result stated.}$$

Also solved in the same manner by *G. W. GREENWOOD*.

GEOMETRY.

195. Proposed by *F. L. SAWYER*, Mitchell, Ontario, Canada.

The diagonals of a four-sided figure are h and k , and the area is A ; show that the area of the circumscribing square is

$$\frac{h^2 k^2 - 4A^2}{h^2 + k^2 - A^2}.$$

Solution by *J. R. HITT*, Principal Liberty High School, Goss, Miss.; *J. SCHEFFER*, A. M., Hagerstown, Md.; and *L. L. LOCKE*, Professor of Mathematics, Adelphos College, Brooklyn, N. Y.

Let $AC=h$, $BD=k$, be the diagonals of the four-sided figure, and $EFGH$ the circumscribing square. Draw GK , GL , parallel to h , k , respectively, and denote HK , FL , by a , b , respectively.

$\triangle GKL = \frac{1}{2} GK \cdot GL \sin KGL = \frac{1}{2} h k \sin P = A$. If $x =$ side of square, we have, $\triangle GKL = A = x^2 + \frac{1}{2} ax - \frac{1}{2} bx - \frac{1}{2}(a+x)(x-b) = \frac{1}{2}(x^2 + ab)$.

Hence, $b = 1/a(2A - x^2) \dots (1)$.

Also, $GL^2 = k^2 = x^2 + b^2$, $GK^2 = h^2 = x^2 + a^2$.

Hence, $a^2 = h^2 - x^2 \dots (2)$, and, by adding, we get $2x^2 = h^2 + k^2 - (a^2 + b^2) \dots (3)$. Substituting in (3) the values of b and a from (1), (2), we have, $2x^2 = (h^2 + k^2) - (2A - x^2)^2 / (h^2 - x^2) - (h^2 - x^2)$, whence, $x^2(h^2 + k^2 - 4A) = h^2 k^2 - 4A^2$.

Therefore, $x^2 = \frac{h^2 k^2 - 4A^2}{h^2 + k^2 - 4A}$.

Also solved by *G. B. M. ZERR*.

